CLAIMS

1. A semiconductor laser driving device comprising:

a semiconductor laser (1);

a photodetecting element (2) for receiving a part of light emitted from the semiconductor laser (1) and converting the part of light into an electric signal (Vopt) corresponding to a light amount;

a laser driving circuit (4) for inputting a driving signal (Id) into the semiconductor laser (1) in such a manner that an average value (Vm) of the electric signal coincides with a given target value;

a high-frequency superimposing circuit (12) for superimposing a high-frequency signal (Uf) over the driving signal (Id); and

a high-frequency superimposing control section (5) for controlling an amplitude (ϕ) of the high-frequency signal (Uf),

wherein the high-frequency superimposing control section (5) controls the amplitude (ϕ) in such a manner that a peak-to-average ratio (R) that is a ratio of a peak value (Vp) of the electric signal (Vopt) with respect to the average value (Vm) of the electric signal (Vopt) does not increase above a given first reference value (Rs).

2. A semiconductor laser driving device according to claim 1, wherein the high-frequency superimposing control section (5) further controls the amplitude (ϕ) in such a manner that the

peak-to-average ratio (R) does not decrease below a given second reference value (Rw) equal to or lower than the first reference value (Rs).

3. A semiconductor laser driving device according to claim 1 or 2, further comprising a peak detecting circuit (7) for receiving the electric signal (Vopt) from the photodetecting element (2) and for detecting the peak value (Vp) of the electric signal (Vopt),

wherein the high-frequency superimposing control section (5) calculates the peak-to-average ratio (R) based on the peak value (Vp) detected by the peak detecting circuit (7).

4. A semiconductor laser driving device according to claim 1 or 2, further comprising: a temperature sensor (9) for measuring a temperature (T) of the semiconductor laser (1); and

a storing section (8) for storing data indicative of a relationship of the average value (Vm), the temperature (T), the amplitude (ϕ), and the peak-to-average ratio (R),

wherein the high-frequency superimposing control section (5) reads out the data from the storing section (8), so as to control the amplitude (ϕ) based on the data, the average value (Vm), and the temperature (T).

5. A semiconductor laser driving device according to any one of claims 1 to 4, wherein the high-frequency superimposing

control section (5) controls the amplitude (ϕ) in such a manner that the amplitude (ϕ) decreases as the temperature (T) of the semiconductor laser increases.

6. A semiconductor laser driving device according to any one of claims 1 to 5, wherein the high-frequency superimposing control section (5) controls the amplitude (ϕ) in such a manner that, the amplitude (ϕ) decreases as the average value (Vm) increases if the average value (Vm) is less than a given threshold value (Vth), whereas the amplitude (ϕ) increases as the average value (Vm) increases if the average value (Vm) is larger than the threshold value (Vth).

7. A semiconductor laser driving device according to any one of claims 1 to 6, wherein the high-frequency superimposing control section (5) comprises a linear speed acquiring section (95) for acquiring a linear speed V of an optical recording medium (26) from which information is to be reproduced by use of the emitted light, and wherein the high-frequency superimposing control section (5) controls the amplitude (ϕ) in such a manner that the peak-to-average ratio (R) is proportional to $\sqrt{}$(V/Vo) at a standard linear speed Vo which is a standard value of the linear speed V.

8. A semiconductor laser driving device according to any one of claims 1 to 5 and 7, wherein the high-frequency superimposing control section (5) comprises a data acquiring

section (59) for acquiring the first reference value (Rs) by reading out, from the optical recording medium (26) from which information is to be reproduced by use of the emitted light and on which an allowance value (P) of the peak value (52) of the emitted light is recorded, the recorded allowance value (P).

9. A semiconductor laser driving device according to any one of claims 1 to 5 and 7, wherein the high-frequency superimposing control section (5) comprises a test executing section (91) for judging the first reference value (Rs) by recording a test pattern into a test recording area (82A) of the optical recording medium (26) from which information is to be reproduced by use of the emitted light and which has the test recording area (82A) and by reading the test pattern while varying the amplitude (ϕ).

10. A semiconductor laser driving device according to claim 9, wherein the high-frequency superimposing control section (5) further comprises:

a reference value recording section (92) for recording the first reference value (Rs) judged by the test executing section (91) into the optical recording medium (26); and

a data acquiring section (59A) for reading out the recorded first reference value (Rs) from the optical recording medium (26) on which the first reference value (Rs) is recorded.

11. A semiconductor laser driving device according to any one of claims 1 to 10, wherein a wavelength of the light emitted from the semiconductor laser (1) is $390nm < \lambda < 420nm$.

12. An optical head device comprising the semiconductor laser driving device of any one of claims 1 to 11.

13. An optical information processing device comprising the optical head device of claim 12.

14. An optical recording medium from which information is to be reproduced by the semiconductor laser driving device of claim 8 and which records the allowance value (P).